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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/722,367	11/28/2000	Robert A. Drebin	723-968	5954

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EXAMINER	
NGUYEN, KIMBINH T	
ART UNIT	**PAPER NUMBER**
2671	12

DATE MAILED: 09/25/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/722,367	DREBIN ET AL.	
	Examiner	Art Unit	
	Kimbinh T. Nguyen	2671	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 July 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3,5-16 and 18-49* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *25,46,48 and 49* is/are allowed.

6)☒ Claim(s) *1-3,5-16,18-24,26-45 and 47* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *10* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

1. This action is responsive to amendment filed 07/14/03.

2. Claims 1-3, 5-16 and 18-49 are pending in the application.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1, 2, 5, 6, 10, 12-16,18-24, 28, 30, 31, 33, 35, 36, 39, 40, 42-45 and 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gossett et al. (6,236,413) in view of Kajiya et al. (5,977,977).

Claims 1 and 16, Gossett et al. discloses in a graphics pipeline (col. 5, line 54), a hardware shader (texture-shader subsystem 133, col. 5, line 56) that blends inputs to provide color output that is fed back (col. 3, lines 11-13) for use as an input for blending operation (col. 8, lines 1-18). Gossett does not teach a blending operation that provides both color blend and alpha blend operations. However, Kajiya et al. teaches the combination of color blend and alpha blend operations (using the pixel engine 406 performs the color and opacity (alpha) operations; col. 81, line 42 through col. 82, line 32; col. 84, lines 16-22). It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the blending operation in a multi-pass

rendering as taught by Kajiya into the graphics pipeline optimized by the Gossett's teaching to provide a calculated color or opacity for blending operation, because using the combination of color and alpha blending operations, it would significantly improve processing by eliminating duplicated work (no additional cost in term of processing speed) for processing the background opacity of a complex graphics image (col. 84, lines 13-15). Further, **claim 16,** Kajiya also teaches the component includes a texture color combiner and an alpha combiner (col. 81, lines 42 through col. 82, line 28).

Claims 2, 5, 6, 10, 12 and 13, Gossett et al. discloses an output of the shader can be recirculated to provide a blending stages (col. 8, lines 1-18); the pipeline includes a recirculating texture unit coupled to the shader, the recirculating unit performs a texture mapping (fig. 2, col. 7, line 62 through col. 8, lines 27); the shader includes a programmable clamper (the light colors is clamped) (col. 9, lines 15-21, lines 45-47); an output of the shader is made available as an input for blending operations (col. 8, lines 7-14); the shader includes a feedback (col. 3, lines 7-16); the feedback includes buffers (frame buffer 109, z buffer 110) for retaining an output for blending and at least one of the buffers has an output connected to an input of the shader (col. 6, lines 3-14).

Claims 14, 15, Gossett clearly anticipated a multi-texturing; a) passing texture mapping data through a component combining to provide combined textured outputs; b) reconfiguring the components 201-205 combining (col. 7, lines 51-53) (Gossett teaches using multi-pass via the recirculation pipe to reconfigure the appropriate components: texture address unit 201, texture filter unit 202, texture environment unit 203, per-pixel

lighting unit 204 and light environment unit 205 to execute the particular operation such as filter, blending, shading; c) passing the combined textured component outputs through the reconfigure to provide combined multi-textured outputs (the outputs of multi-texture filter operations are combined in the texture environment unit 202) (col. 10, lines 46-63) . Gossett does not teach a blending operation that provides both color blend and alpha blend operations. However, Kajiya et al. teaches the combination of color blend and alpha blend operations (using the pixel engine 406 performs the color and opacity (alpha) operations; col. 81, line 42 through col. 82, line 32; col. 84, lines 16-22). It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the blending operation in a multi-pass rendering as taught by Kajiya into the graphics pipeline optimized by the Gossett's teaching to provide a calculated color or opacity for blending operation, because using the combination of color and alpha blending operations, it would significantly improve processing by eliminating duplicated work (no additional cost in term of processing speed) for processing the background opacity of a complex graphics image (col. 84, lines 13-15).

Claims 18-20, Gossett et al. discloses a) generating first texture mapping data; b) generating second texture mapping data; d) passing the second texture map and the first output through the combiner hardware to provide a second output corresponding to the first and second texture map; step b) is performed during a blending, step d) is performed during a further blending is later than the first blending the combiner hardware provides more than ten (filter4 mode that is applied to sixteen sample values in a multi-pass operation to provide at least sixteen successive passes of blending) (col.

10, lines 31-37; figs. 10-15). Gossett does not teach the combination of both color blend and alpha blend operations. However, Kajiya et al. teaches the combination of color blend and alpha blend operations (using the pixel engine 406 performs the color and opacity (alpha) operations; col. 81, line 42 through col. 82, line 29; col. 84, lines 16-22). It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the blending operation in a multi-pass rendering as taught by Kajiya into the graphics pipeline optimized by the Gossett's teaching to provide a calculated color or opacity for blending operation, because using the combination of color and alpha blending operations, it would significantly improve processing by eliminating duplicated work (no additional cost in term of processing speed) for processing the background opacity of a complex graphics image (col. 84, lines 13-15).

Claims 21-24, Gossett et al. clearly anticipated a pipeline includes texture map unit (texture filter unit 202) and a texture environment (texture environment unit 203) including combiner circuits (col. 8, lines 48-56), an improvement comprising iteratively reusing the combiner circuits (components 201-205) to provide multiple stages that apply multiple textures to a surface displayed within an image (col. 7, lines 48-53); the iteratively reusing includes using the combiner circuits to combine first texel colors during a first stage (or first pass), using the same combiner circuits to combine second texel colors using a second blending stage (second pass) different from the first stage (completely independent of other operation, col. 10, lines 16-17), both first and second stages are consecutive (col. 2, lines 4-7) falling within a period for generating a single image frame; the combiner circuits comprise independent color combiner circuits (col.

10, lines 51-63). Gossett does not teach the multiple passes each provide both color blend and alpha blend. However, Kajiya et al. teaches this feature (see the rejection of claim 1 above).

Claims 28, 30, 31, 33, 35, 36, 39, 40, 42-45 and 47, Gossett et al. discloses a texture environment unit (col. 8, lines 45-56) configured within the pipeline to process input texture, color and alpha, the texture environment having a feedback mechanism (recirculation pipe) operable during selected temporal processing stages; the texture environment unit may accommodate up to sixteen (8 samples take 2 passes) successive temporal processing stages (col. 10, lines 31-37); the feedback mechanism comprises storage registers (caches) (col. 3, lines 11-16); blending operation (col. 8, line 18) and recirculating (col. 3, line 14); a multitexture for performing blending/shading and recirculating (col. 10, lines 47-63); recirculating pipeline 211 to provide an output that is fed back for use in blending operation (col. 3, lines 11-16). Gossett does not teach the multiple passes each provide both color blend and alpha blend. However, Kajiya et al. teaches this feature (see the rejection of claim 1 above).

5. Claims 26 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gossett et al. (6,236,413) in view of Kirk et al. (6,333,744).

Claims 26 and 27, Gossett et al. discloses a color/alpha component blending unit (texture filter unit) configured within the pipeline to combine texture, rasterized color and/or alpha component data to produce a computed color (col. 9, lines 3-4) and a feedback (recirculation pipe) that enables reintroduction of the computed color into the pipeline, wherein multiple textures is achieved by an iterative use/reuse of the blending

unit (col. 7, lines 48-50). Gossett does not teach rasterized color and alpha component data to produce a computed color and a computed alpha. However, Kirk et al. teaches this feature (col. 4, lines 14-26); the blending unit comprises multipliers and one adder and is configured to accept up to four input arguments (r,g,b,alpha) for blending operations (col. 8, lines 10-52). It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the combiner stage as taught by Kirk's method into a processing pipeline rendering having feedback mechanism taught by Gossett's method for combining four of a plurality of selectable input values including color and alpha to produce the computed color and alpha component, because it would provide an improved graphics accelerator capable of more rapidly producing multitextured 3D output images (col. 1, lines 8-10).

6. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gossett et al. (6,236,413) in view of Kajiya et al. (5,977,977), and further in view of Cook (ACM, Computer Graphics, Volume 18, Number 3, July 1984), pages 223-232.

Claim 3, Cook discloses recirculation of the shader output (an intermediate step) allows shade tree type combining operations (section 3. Shade trees, page 224). It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the Cook's teaching into Gossett's method for utilizing shade tree type into shading operation, because this is particularly useful in rendering a surface that consists of different materials (page 224).

7. Claims 11, 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gossett et al. (6,236,413) in view of Kajiya et al. (5,977,977), and further in view of Van Hook et al. (6,331,856).

Claim 11, Van Hook et al. discloses the shader includes separate blending circuits for color blend and alpha blend operations (figs. 27 and 28). It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the Van Hook's teaching into Gossett's method for utilizing blending operation, because the mode blender can perform different conditional color blending and z buffer updating, and therefore can handle all other various types of surface (opaque surfaces, transparent surfaces) (col. 54, lines 39-43).

Claim 29, Van Hook et al. discloses the blending unit is connected to storage register for making an output as an input (figs. 7). It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the Van Hook's teaching into Gossett's method for utilizing registers, because it would provide register instruction format to access data bit within data memory (col. 18, lines 27-32).

8. Claims 32, 34, 37, 38 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gossett et al. (6,236,413) in view of Kajiya et al. (5,977,977), and further in view of Kirk et al. (6,333,744).

Claims 34, 41, Kirk et al. discloses the input texture and rasterized color data comprises RGB and alpha data (figs. 18 and 19). It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate a rasterizing stage as taught by Kirk's method into a processing pipeline rendering having feedback

mechanism taught by Gossett's method for producing the computed color and alpha component, because it would provide an improved graphics accelerator capable of more rapidly producing multitextured 3D output images (col. 1, lines 8-10).

Claims 32, 37, 38, the rationale provided in the rejection of claims 26 and 27 is incorporated herein.

9. Claims 7-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gossett et al. (6,236,413) in view of Kajiya et al. (5,977,977), and further in view of Myhrvold et al. (5,867,166).

Claims 7-9, Myhrvold et al. discloses a programmable scaler (col. 72, lines 50-65; col. 74, lines 40-41); the shader includes a comparator and color swap (col. 71, lines 10-13). It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the Myhrvold's teaching into Gossett's method for utilizing scaler, comparator and color swap, because it would provide a hardware implementation of the sort logic for blending operation (col. 71, line 10).

Allowable Subject Matter

10. Claims 25, 46, 48 and 49 allowed.

The following is a statement of reasons for the indication of allowable subject matter:

The prior art does not disclose the combiner circuits computed by:

(D + (-1)sub * ((1-c) * A+C * B) + bias) << shift; the single texture address coordinate/data processing unit interleaves the processing of logical direct and indirect texture coordinate data.

Response to Arguments

11. Applicant's arguments with respect to claims have been considered but are moot in view of the new ground(s) of rejection.

With respect to Applicant's arguments, original dependent claims 4 and 17 have been canceled; independent claims have been amended and added the limitations of claims 4 and 17 for the shader (blending hardware) provides both color and alpha blending. This limitations taught by Kajiya et al. (5,977,977), see the Office Action. Therefore, the rejection is maintained.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Kimbinh Nguyen** whose telephone number is **(703) 305-9683**. The examiner can normally be reached **(Monday- Thursday from 7:00 AM to 4:30 PM and alternate Fridays from 7:00 AM to 3:30 PM)**.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Zimmerman, can be reached at (703) 305-9798.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

Washington, D.C. 20231

Or faxed to:

(703) 872-9314 (for Technology Center 2600 only)

Hand-delivered responses should be brought to Crystal Part II, 2121 Crystal Drive, Arlington, VA, Sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service Office whose telephone number is (703) 306-0377.

September 22, 2003

/Kimbinh Nguyen/

Kimbinh Nguyen

Patent Examiner AU 2671